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ABSTRACT

The economic impact of resident and nonresident students attending Arizona universities during the 1981-1982 academic year was studied, along with the cost of education compared to economic benefits to the state created by nonresident students. Expenditures were classified as direct out-of-pocket expenditures by students, direct expenditures by the three Arizona universities for the cost of education of students, and induced expenditures, or those that result for the respending of direct expenditures. Findings include the following: students (including out-of-state visitors) expended an estimated $334.4 million in direct funds exclusive of tuition and fee payments; Arizona resident students expended an estimated $235.8 million or 70.5 percent of these direct funds in 1981-1982; nonresident students (including their out-of-state visitors) expended an estimated $98.5 million or 29.5 percent of these direct funds; the average full-time-equivalent (FTE) resident student expended $4,619 in direct funds, while the comparable figure for FTE nonresident student and visitors was $6,317. Information is also presented on state taxes generated by nonresident students, jobs created by nonresident students, state subsidy for nonresident students, and fixed and variables costs for nonresident students. (SW)

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A STUDY OF THE ECONOMIC IMPACT OF SPENDING BY STUDENTS IN ARIZONA UNIVERSITIES

By

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Summer, 1982

Arizona Board of Regents
1535 West Jefferson, Room 121
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SUMMARY OF FINDINGS

I. Direct Expenditures by All University Students

In the 1981-82 academic year, students in Arizona universities (including related out-of-state visitors) expended an estimated $334.4 million in direct funds exclusive of tuition and fee payments.

II. Direct Expenditures by Resident Students

Arizona resident students expended an estimated $235.8 million or 70.5 percent of these direct funds in 1981-82.

III. Direct Expenditures by Non-Resident Students

Non-resident students (including their out-of-state visitors) expended an estimated $98.5 million or 29.5 percent of these direct funds in 1981-82.

IV. Expenditures Per FTE Student

The average FTE resident student expended $4,619 in direct funds. The average FTE non-resident student (including out-of-state visitors) expended $6,317 in direct funds.

V. Induced Expenditures Attributable to Non-Resident Students

Using the economic multipliers developed by Dr. Carol A. Taylor, Research Specialist with the Division of Economic and Business Research of the University of Arizona, the total direct and induced student expenditures in the Arizona economy as a result of non-resident students in the 1981-82 academic year was $122.9 million or $7,877 per FTE non-resident student.

VI. State Taxes Generated by Non-Resident Students

The amount of state taxes generated as a result of the direct and induced expenditures attributable to non-resident students in the 1981-82 academic year is estimated to be $2.9 million. This is an average of $187 per FTE non-resident student. In addition, $166 in state taxes per FTE non-resident student was generated by university expenditures related to non-resident students. Thus, a total of $353 in state taxes is estimated as being generated as a result of each non-resident student.

VII. Jobs Created by Non-Resident Students

An estimated 4,444 jobs are attributable to the economic impact of non-resident students at the three Arizona universities. Some 1,832 jobs are primarily in the private non-university sector and 2,612 jobs are primarily in the public sector where they are supported by state appropriations and tuition and fee revenues.

VIII. State Subsidy for Non-Resident Students

The estimated average cost of education per FTE student in 1981-82 was $3,815 (the estimated cost of $3,858 less the mid-year budget reduction). By subtracting the non-resident tuition and fee collections of $2,487 ($2,950 tuition rate reduced by tuition and fee waivers and certain student activity fees), and subtracting the $187 in state taxes generated by the spending of each FTE non-resident student and then subtracting the $166 in state taxes generated by university expenditures related to non-resident students, it is estimated that the average non-resident student in 1981-82 was subsidized by the State of Arizona in the amount of $975 ($3,815 - $2,487 - $187 - $166 = $975).

IX. Non-Resident Student - Fixed and Variable Costs

University expenditures related to educating students are composed of fixed and variable costs. It is extremely difficult to identify the precise mixture of fixed and variable costs that make up the $3,815 average cost of education for 1981-82. However, it can be stated that if all non-resident students left our universities this would not result in a saving of $3,815 for each student not enrolled. It may be at least interesting to consider the following hypothesis:

1. The state subsidy per average non-resident student in 1981-82 was $975.
2. If it is assumed that approximately 25 percent of the cost of education is a fixed cost, at least in the short term, (.2555 x $3,815 = $975) and all non-resident students left the universities, the State of Arizona would have to continue to provide $15.2 million ($975 x 15,596 non-resident students = $15.2 million) to the universities to cover the fixed costs. This would increase the average cost of education for the remaining 51,062 resident students from $3,815 to $4,113 per FTE student.
3. The $15.2 million in fixed costs represents $975 per FTE non-resident student which balances the above-mentioned state subsidy of $975 per non-resident student. Thus, a 25 percent fixed cost rate is the breakeven point at which the state would no longer be subsidizing non-resident students.

INTRODUCTION

Economic impact studies provide a means of demonstrating the measurable economic impact of educational institutions on their local communities. However, there is the danger of stressing the measurable and the financial, at the risk of losing sight of higher education's primary purposes of instruction, research and public service.

The model used in this study is a simple, credible way to estimate cash flow. The focus is on short-run economic impacts. The political, social or aesthetic impacts of students on the community are not considered in this study. Likewise, no consideration is given to the long-term increases in the tax base resulting from (1) non-resident students working in Arizona after graduation, (2) the locating of manufacturing and research enterprises in Arizona in part due to the educated pool of workers, and (3) the increased productivity and lifetime earning power of university graduates.

The cost of educating university students is frequently thought of in the limited context of the state appropriations to the universities. Occasionally, we need to review the economic effects of student spending which can partially offset the cost of education. Students are spending considerable sums on housing, food, transportation and other living expenses which support tax-paying businesses and jobs. These tax revenues help offset public tax subsidies of students' education. This is particularly evident in the case of the non-resident student who brings new money into the state.

Objectives

There were two primary objectives of this study; (1) to determine the economic impact of resident and non-resident students attending Arizona

universities during the 1981-82 academic year, and (2) to compare the cost of education to economic benefits to the state created by non-resident students.

Research Design

The study population was Full-Time Equivalent (FTE) public university students in Arizona. An FTE is defined as fifteen (15) credit hours of course work for undergraduate and ten (10) credit hours of course work for graduate students.* This results in a greater number of graduate students than would be the case if fifteen (15) credit hours was used as the definition of an FTE for all student levels.

The year studied is the 1981-82 academic (nine-month) year. Data were collected on an academic year basis (excluding summer school). No estimates of student economic impact were made for students attending summer school or non-resident academic year students living in Arizona during the summer but not attending summer school. The effect of these exclusions should be to underestimate the economic impact of students which is consistent with the general intent in the study to make sure that any errors were on the conservative side.

Every effort was made to use existing data. Where possible, survey data used in previous economic impact studies done by the universities were adjusted to achieve comparability and modified for inflationary and enrollment changes. Expenditures in this study are classified into three general categories:

1. Direct Student Expenditures - direct out-of-pocket expenditures by university students in Arizona. These include on-campus room and board but exclude any room expenditures for commuters living at home. No

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* This definition is used rather than headcount to correct for the part-time students who take only a few credit hours of course work.

tuition or fee expenditures are included. For non-resident students the expenditures made by out-of-state visitors who are visiting the non-resident students are included as direct expenditures attributable to non-resident students.

2. Direct University Expenditures - direct expenditures by the three Arizona universities for the cost of education of students. The total Instruction, Student Services and prorated Academic Support and Institutional Support functions make up the cost of education. The primary sources of funds for direct university expenditures are state appropriations and student tuition and fees.
3. Induced Expenditures - these are expenditures that result from the re-spending of direct expenditures.

Enrollment data have been provided by the universities according to the state residency of the students and where they live locally (i.e., at home, on campus or off campus). Estimates of direct student expenditures have been derived from previous economic impact studies and student budgets from the universities' financial aid offices. The enrollments were multiplied times the direct student expenditures to arrive at total direct student expenditures. From the direct expenditures (Table 1), the induced (multiplied) expenditures were determined. The state income, sales and excise taxes generated from all of these expenditures and the jobs created are computed by use of the econometric model data (Table 2).

To develop the data needed to compare the cost of education to economic benefits to the state resulting from non-resident students, the budgeted cost of education (Board of Regents' defined) was reduced to reflect the mid-year budget

reduction. Next, the cost of education was divided by the audited, Fall 1981 FTE students to arrive at the cost per FTE student. To develop the economic benefits to the state, the tuition and fee collection data for non-resident students, as provided by the universities, were divided by the numbers of non-resident FTE students to arrive at collections per non-resident student. Likewise, the state income, sales and excise taxes generated as a result of non-resident student direct expenditures and university expenditures related to non-resident students were calculated on an FTE non-resident student basis. The revenues were deducted from the costs to arrive at the net state subsidy per non-resident student (Table 3). Assumptions regarding the size of the fixed and variable portions of the average per FTE cost of education were made in order to examine the question of what the financial impact to Arizona would be if there was a significant reduction in the number of non-resident students (Table 4). A general model of student economic impacts is illustrated in Figure 1.

During each step in the development of this study, the universities have provided data and university economists have assisted in interpretation of the respective universities' economic impact studies. The development of economic multipliers and estimates of state taxes and jobs were done by an economist from the Division of Economic and Business Research at the University of Arizona.

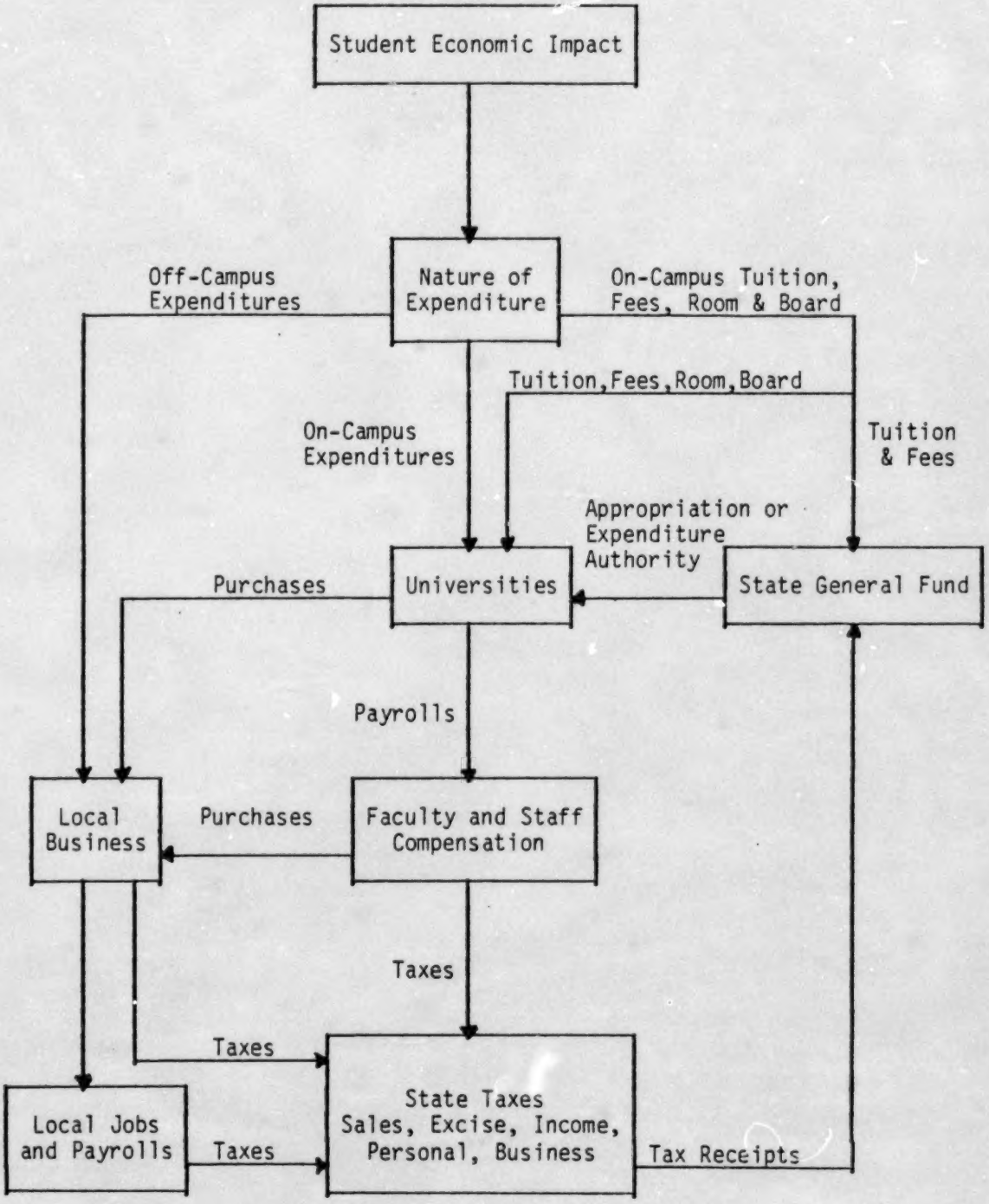
Limitations

The spending of non-resident students is probably underestimated. Carbone, in Students and State Borders, indicates that:

> In many cases, the non-resident comes from a more affluent family situation than does the resident, simply because families with fewer resources can't afford to send their sons and daughters to out-of-state schools (Carbone, p.1).

FIGURE 1

MODEL OF STUDENT ECONOMIC IMPACTS



It stands to reason that non-resident students spend more than their resident counterparts. This factor could not always be reasonably estimated with the available data, so in the interest of conservatism, non-resident student expenditures are assumed to be the same as resident student expenditures in the computation of the direct expenditures per student. It is interesting to note that non-resident spending estimates are available for Arizona State University and that they are about 12.5 percent greater than the average student expenditures. The resident and non-resident per student cost differential in Table 1 is largely the result of greater numbers of non-resident students living off campus, and the zero housing expenditures for resident commuter students living at home.

In addition to the above underestimations, the exclusion of summer school students, and the use of conservative (short-run) economic multipliers (i.e., a 1.27 income multiplier and a 1.44 jobs multiplier are used with other multipliers) contribute to a conservative estimation of student expenditure impacts. On the other hand, the cost of education is underestimated in that only the university operating budget expenditures were included in the calculated cost of education and no costs for capital facilities were included.

It is reasonable to assume that a number of non-resident students establish residency after their first year in Arizona but frequently continue to bring in out-of-state funds that impact the Arizona economy. The economic impact of these students is not considered in this study.

FINDINGS

I. Direct Expenditures by All University Students

A total of $334.4 million was directly expended in the 1981-82 academic year by students at the three Arizona universities (see Table 1). This does not include tuition and fee payments (except for some minor student activity fee payments which go to auxiliary enterprises). It does include on-campus room and board and expenditures of out-of-state visitors to non-resident students. In two of the three universities commerical food services handle the board. In all cases room and board are auxiliary enterprises and are not operated with state appropriations.

Approximately $87.9 million was spent on off-campus housing by students at the three universities. Certainly, this had a substantial impact on the real estate markets surrounding the universities. Likewise, spending for food was $81.1 million which impacts both the grocery and restaurant businesses. The transportation total of $51.8 million (not including Northern Arizona University where separate figures were not available), impacts the auto sales, repairs, insurance and gasoline businesses. Another $97.5 million was expended on miscellaneous items like clothing, recreation, laundry, etc. The above figures are only direct expenditures from student spending and do not include the multiplying effect of student expenditures being re-spent by those initially receiving them. Table 1 shows these direct expenditure categories broken down for resident and non-resident students.

II. Direct Expenditures by Resident Students

Arizona resident students expended $235.8 million or 70.5 percent of the total direct expenditures in 1981-82. This does not include housing

TABLE 1

ARIZONA PUBLIC UNIVERSITIES
DIRECT EXPENDITURES OF RESIDENT AND NON-RESIDENT STUDENTS*
1981-82 (Academic Year)

	Number of FTE Students	Expenditures Per FTE Student	Dollars
Residents			
Housing		$ 1,364	$ 69,642,913
Food		1,145	58,475,847
Transportation		717	36,588,124
Miscellaneous		1,393	71,131,524
Total	51,062	$ 4,619	$235,838,408
Non-Residents			
Housing		$ 2,199	$ 34,295,790
Food		1,452	22,647,622
Transportation		973	15,172,801
Miscellaneous		1,693	26,408,656
Total	15,596	$ 6,317	$ 98,524,869
Combined			
Housing		$ 1,559	$103,938,703**
Food		1,217	81,123,469
Transportation		777	51,760,925
Miscellaneous		1,463	97,540,180
Total	66,658	$ 5,016	$334,363,277

Source: Data provided by the universities and university economic surveys updated for inflation and adjusted to meet the needs of a state-level study.

* Includes on-campus room and board and $4.1 million in estimated expenditures by of-state visitors related to non-resident students. Excludes tuition and most fees.

** $87.9 million was for off-campus housing.

expenditures for commuter students living at home because such expenditures, in most cases, would remain in Arizona regardless of whether or not the students attended school. Therefore, it does not appear appropriate to include them as student-related expenditures.

III. Direct Expenditures by Non-Resident Students

Non-resident students expended $98.5 million or 29.5 percent of the total student direct expenditures in 1981-82. While non-resident students represent 23 percent of the total FTE students, they account for 33 percent of the total housing expenditures, 28 percent of the food expenditures, 29 percent of the transportation expenditures, and 27 percent of the miscellaneous expenditures. These percentages are probably on the low side due to the reasons outlined in the Limitations section of the Introduction.

IV. Expenditures Per FTE Student

The average Arizona resident FTE student expended $4,619, not including tuition and fees in 1981-82. The average non-resident FTE student expended $6,317, including out-of-state visitor expenditures but not including tuition and fees. Non-residents account for 23 percent of the students but make 37 percent more expenditures than residents on an FTE student basis ($6,317 ÷ $4,619 = .37).

V. Induced Expenditures Attributable to Non-Resident Students

When dollars are expended, they create jobs which result in state income, sales and excise tax collections and the creation of additional spending, jobs, etc. This is called the induced or multiplier effect. Five different economic multipliers are used, depending on the category of expenditure. For example, the number of jobs created from spending for off-campus housing rent is quite

different than the number of jobs created from spending for transportation. Therefore, it is appropriate to use a different multiplier for transportation expenditures. The multipliers were derived from the Interactive Add-up Econometric Model for Arizona and its three major subcomponent regions: Phoenix SMSA, Tucson SMSA and the balance of the state. The model simultaneously estimates population (separating natural increase and net migration), personal income (divided into 12 major components), and employment (approximately 50 industrial categories) for each of the three sub-state areas and the state aggregate. It was developed by Dr. Carol Taylor and Dr. Alberta Charney at the University of Arizona with funding from the National Science Foundation.

The total direct and induced (personal consumption) expenditures for non-resident students is estimated to be $122.9 million or $7,877 per FTE student. Table 2 shows the direct and induced expenditures, state taxes and jobs attributable to university students in Arizona.

VI. State Taxes Generated by Non-Resident Students

An estimated $2.9 million in state income, sales and excise taxes were generated in 1981-82 as a result of non-resident student-related spending. This is an average of $187 per FTE non-resident student. By comparison, resident student spending generated $6.9 million in state taxes or $135 per FTE resident student in 1981-82. It should be noted that county and municipal taxes were not included in this study. The study figures do include state personal income, sales and excise taxes.

Because a large component of the student population comes from outside of Arizona, it can be assumed that non-resident students require a significant increase in the size of university operations and spending. However, these added state expenditures for non-resident students generate taxes that revert to

TABLE 2

ARIZONA PUBLIC UNIVERSITIES
SUMMARY OF DIRECT AND INDUCED EXPENDITURES, STATE TAXES AND JOBS
1981-82 (Academic Year)
Dollars in Millions

Economic Impact of Student and University Spending		Student Spending			University-Cost of Education-Spending			Student and University Direct and Induced Total
		Direct	Induced[1]	Direct & Induced Sub-Totals	Direct[2]	Induced[1]	Direct & Induced Sub-Totals	
Residents	Expenditures	$ 235.8	$ 58.3	$ 294.1	$ 194.5	$ 140.9	$ 335.4	$ 629.5
	Taxes	3.7	3.2	6.9	7.1	1.4	8.5	15.4
	Jobs	3,118.5	1,372.2	4,490.7	6,072.9	2,463.7	8,536.6	13,027.3
Non-Residents	Expenditures	98.6	24.3	122.9	59.5	45.0	104.5	227.4
	Taxes	1.6	1.3	2.9	2.2	0.4	2.6	5.5
	Jobs	1,272.2	559.7	1,831.9	1,858.2	753.8	2,612.0	4,443.9
Totals	Expenditures	334.4	82.6	417.0	254.0	185.9	439.9	856.9
	Taxes	5.3	4.5	9.8	9.3	1.8	11.1	20.9
	Jobs	4,390.7	1,931.9	6,322.6	7,931.1	3,217.5	11,148.6	17,471.2

[1] Source: Carol A. Taylor, Derivation of Jobs and State Taxes Generated by Students at University of Arizona, Arizona State University and Northern University, Division of Economic and Business Research, University of Arizona, 1982 (unpublished paper).

[2] The sources of funds for the cost of education expenditures are primarily state appropriations, tuition and fees.

the state general fund. An estimated $2.6 million in state income, sales and excise taxes were generated in 1981-82 as a result of university spending for non-resident students for operations included in the calculated cost of education. This is an average of $166 per non-resident student. Thus, the state taxes generated by the combined spending of non-resident students and universities providing educational services for non-resident students amounted to approximately $5.5 million, or $353 per non-resident student.

VII. Jobs Created by Non-Resident Students

Table 2 shows that 1,832 jobs were primarily created in the business community as a result of non-resident students in 1981-82. In addition, some 2,612 jobs on and off university campuses that were funded from state appropriations and student tuition and fee collections can be attributed to non-resident students for a total of 4,444 jobs. Most of the 1,832 jobs in the private sector were in the retail sales and trade areas.

VIII. State Subsidy for Non-Resident Students

The estimated average cost of education per FTE student in 1981-82 was $3,815 (the estimated cost of $3,858 less the mid-year budget reduction). By subtracting the non-resident tuition and fee collections of $2,487 ($2,950 tuition rate reduced by tuition and fee waivers and certain student activity fees), the $187 in state taxes generated by the spending of each FTE non-resident student and the $166 in state taxes generated by university expenditures related to non-resident students, it is estimated that the average non-resident student in 1981-82 was subsidized by the State of Arizona in the amount of $975 ($3,815 - $2,487 - $187 - $166 = $975).

TABLE 3

ARIZONA PUBLIC UNIVERSITIES
COMPARISON OF THE AVERAGE COST OF EDUCATION
TO THE ECONOMIC BENEFITS OF NON-RESIDENT STUDENTS
1981-82 (Academic Year)

Average Cost of Education Per Non-Resident Student[1]		$3,815
Less		
- Tuition and Fee Collections Per Non-Resident Student[2]	$2,487	
- State Tax Collections Based on Student Spending[3]	187	
- State Tax Collections Based on University Spending[4]	166	2,840
Net State Subsidy Per FTE Non-Resident Student		$ 975

NOTE: This analysis does not include the taxes paid to local governments in the form of sales and property taxes.

1 Source: Board of Regents' paper entitled Definition of Cost of Education for Calculation of Tuition Contributions. Unpublished Arizona Board of Regents' document, 8/81. (Adjusted to Fall FTE non-resident students and revised appropriations after the budget reduction in mid- 1981-82).

2 Source: Provided by the universities.

3 Source: Table 2, non-resident student tax revenues of $2.9 million ÷ 15,596 FTE students = $187.

4 Source: Table 2, non-resident student-related university cost of education tax revenues of $2.6 million ÷ 15,596 = $166.

Table 3 shows an average state subsidy per non-resident student of $975. Two reasons why this subsidy is larger than might have been anticipated are tuition waivers averaging $481 per student and the one year lag in non-resident tuition rates (the rates are set at about 84 percent of the previous year's cost of education).

IX. Non-Resident Student - Fixed and Variable Costs

When assessing the cost of non-resident students, it seems important to consider the fixed costs of education that would remain if there were a significant reduction in the number of non-resident students. A brief discussion of elements that make up the cost of education expenditures is useful in seeking to understand the fixed costs in higher education budgets.

The cost of education includes the Instruction, Academic Support (adjusted), Student Services and Institutional Support (adjusted) expenditures. The total cost of education is divided by the total FTE students to arrive at an average cost of education per student. When analyzing the cost of education for non-resident students, the average cost of education per FTE student is frequently used. A common assumption is that if we increase or decrease the number of non-resident students, the total operating budget will change in direct proportion to the change in the number of students times the average cost per student. This is not true. Such analysis using average costs are frequently misleading but are nevertheless used because of the difficulty in determining the precise fixed and variable costs in higher education. Analysis of the average cost of education indicates that many of the costs are fixed in nature and would remain even if large numbers of non-resident students left the state. The average cost of education includes such costs as secretarial support, computer support, curriculum development, financial aid administration,

executive management, fiscal operations, physical plant operations, community relations, etc. Generally, these costs tend to be more fixed than variable. That is, they do not necessarily vary directly with changes in enrollments. A building still must be air-conditioned whether it is occupied by 1,000 or 500 students and approximately the same executive management team is needed for a given university whether there are 30,000 or 25,000 students in attendance. If all non-resident students were to leave Arizona, only their variable costs of education would be reduced and the fixed costs would remain and have to be paid by the state and/or resident students.

Assumption 2 in Table 4 illustrates this concept with numbers and shows that if it is assumed that only 25 percent of the average per student cost of education is fixed, the non-resident student is paying the full variable cost and the state is paying the full fixed cost which, in the short run, it would have to pay whether or not there are non-resident students in Arizona. In other words, a 25 percent fixed cost rate is the breakeven point at which the state is no longer subsidizing non-resident students. It is not unrealistic to assume that at least 25 percent of the average cost of education is fixed and that if there were no non-resident students, these costs would remain for the state and/or resident students to pay.

TABLE 4

COMPARISON OF FIXED AND VARIABLE COST OF EDUCATION ASSUMPTIONS
TO THE ECONOMIC BENEFITS OF NON-RESIDENT STUDENTS

	Non-Resident Variable Cost of Education Per FTE Assumptions	Less Non-Resident Fees, Waivers, Taxes/FTE	= Net Non-Resident* Contribution/(Subsidy)
ASSUMPTION 1 = No fixed costs, all costs variable	$ 3,815	$ 2,840	($ 975)
ASSUMPTION 2 = 25.55 percent of costs of instruction are fixed and would remain if there were no non-resident students	2,840	2,840	-0-
ASSUMPTION 3 = Same as 2 except 30 percent of the costs of instruction are fixed	2,671	2,840	169
ASSUMPTION 4 = Same as 2 except 40 percent of the costs of instruction are fixed	2,289	2,840	551

* The contribution represents the amount that is above the variable costs and is covering fixed costs. This is the amount that would be lost if non-resident students were eliminated and the fixed cost assumptions are true.

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APPENDIX

SUMMARY OF OTHER IMPACT STUDIES

Economic Theory

The economic models used for economic impact studies are rooted in the concepts of economic base theory and local multipliers. Charles D. Salley (Salley, 1976) outlines the economic base theory that relates to non-resident students in the following quote:

> The underlying idea of economic base theory is regional specialization. The division of labor and a corresponding degree of specialization is a prominent characteristic of advanced economies. Great increases in productivity result when each participant in the economy concentrates his productive energy in a single specialized activity where he has a natural or trained ability. One consequence though is a high degree of interdependence. Specialized production activity is dependent on other specialized processes for inputs at their own stage of production. Their output, in turn, is necessary for the net higher level of production leading toward final consumption in the consumer sector.
>
> An area's economic base consists of these specialized activities that produce for a demand that exceeds local consumption, that is, activities that involve sales to firms located elsewhere. Such activities produce an inflow of money income from non-local sources. The non-local income then makes its way as wages and purchases into local trade and service activity.
>
> A sector of economic activity is basic then in the sense that other local income streams depend upon its productivity. The university is such a base sector.

Higher education is viewed as a base sector that is exporting educational services. This is similar to the manufacturing firm that exports (sells) a product to another state. The product is exported in return for out-of-state funds coming into the state. Likewise, by analogy, non-resident students are sold an education in return for their out-of-state funds coming into the state.

The concept of an economic multiplier is simply explained by the fact that when dollars are spent, they create jobs and salaries which in turn are spent

and generate additional salaries and jobs all of which create state sales and income taxes. This induced spending is called the multiplier effect. There are many types of multipliers, such as expenditure multipliers, income multipliers, job multipliers, etc. The size of multipliers tends to increase as the geographical area being studied increases. Therefore, a state-level multiplier will be larger than a county multiplier. This is because more of the induced spending stays within the larger geographical area. The multipliers used in this study are very conservative as contrasted to some studies in other states.

State Level Models

Irwin and Miller in their Analysis of State-Level Studies of the Economic Impact of Higher Education identify 27 studies of which only five were conducted by state higher education agencies. The main purposes of all of these studies were public relations and planning. An example of a state-level study in Washington is presented below because of the significance of its findings.

Eade, in his 1977 dissertation, A Statewide Economic Impact Model for Public Institutions of Higher Education, estimates three economic measurements: Gross State Product (GSP), state payrolls, and state employment levels for the State of Washington. The model includes expenditures of the general colleges, grants and contracts, capital, students, employees and visitors. Its scope is broader than just examining the economic impact of students as in this current study. However, some of Eade's findings are very interesting and are presented here as an illustration of the outputs of such a study and of the significance of public higher education institutions' financial impacts:

The gross impacts on total state income created by public income created by public institutions of higher education in 1975-76 were over four times those which would have been realized by defunding those institutions and returning those appropriations to state taxpayers in the form of a sales tax reduction.

The gross payroll impacts attributable to public institutions of higher education are approximately six times those which would have been realized in 1975-76 by defunding public institutions of higher education and returning those appropriations to state households in the form of a tax reduction.

The gross impact of public institutions of higher education on the state employment level is over four times that which would have been created by defunding public institutions of higher education and returning those appropriations to state households in the form of a state sales tax reduction.

Approximately four percent of the state's gross state product (GSP) was directly or indirectly supported by the higher education industry in 1975-76.

The gross change in the state employment level attributable to the public higher education industry represents approximately 3.6 percent of the total employed labor force.

Even if the institutions had not drawn in vast sums of non-state appropriated support from the federal government and from students, they would still have provided an economic stimulus to the state, since each dollar provided to Washington State's public institutions of higher education provided 39 percent more impact on GSP than a dollar retained in the private sector by state taxpayers.

Clearly, these are significant findings which throw a new light on the economic impact of the higher education enterprise.

Schepman's 1966 study of the impact of out-of-state students on the Utah economy provides the basis for this Arizona study. Schepman determines the taxes generated as a result of direct and multiplied expenditures of out-of-state students. These taxes are then compared to the cost of educating out-of-state students, less their tuition payments. Schepman's early study shows a state subsidy of out-of-state students at a time when tuition was relatively low. The examination of the state subsidy, or the out-of-state student net contribution to the state, is the key idea borrowed from Schepman.

Homan, et al. in a 1971 study "State Cost and Benefits from Out-of-State Students" in Oklahoma, presents a straightforward model which takes out-of-state student expenditures by expense category times the appropriate state sales and excise taxes. Homan then uses an income multiplier to arrive at indirect expenditures. Expenditure category amounts are reduced to recognize that all gross expenditures are not taxable before the appropriate sales and excise taxes are applied. The increases in state income tax collections, based upon the jobs and personal income derived from the multipliers, are determined. The taxes are summed and divided by the number of out-of-state students to arrive at a tax figure per student. This figure is compared to the net (after tuition) state appropriation subsidy. This study concluded that out-of-state students were an economic asset. This methodology is not significantly different from the Schepman study.

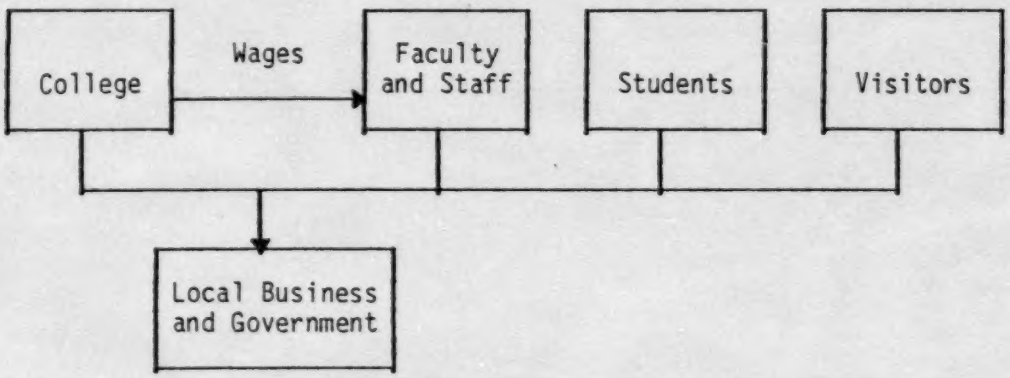
Salley in Georgia State University Spending Patterns and the Atlanta Economy points out a number of the problems with earlier studies, particularly in the area of income multipliers. He notes that many of the multipliers have been too large resulting in overstatement of indirect expenditure impacts. He develops methods for correcting the multipliers. Salley's contribution to this study is an increased sensitivity to the use of conservative multipliers so as to err on the low side.

The state-level models range from Eade's comprehensive state-level model to the more focused non-resident student impact models of Schepman and Homan on which this Arizona study is based. The major contributions of these studies are their use of existing data when possible, the use of income multipliers, and the comparison of increased tax collections to net non-resident student education subsidies.

Institutional Level Models

The models used for the studies that have been done at the universities in Arizona are largely based upon the landmark study by Caffrey and Isaacs, Estimating the Impact of a College or University on the Local Economy, which provides a number of conceptual models in varying levels of complexity. The simplest expenditure model is presented in Figure 2.

FIG. 2. A simple expenditure model

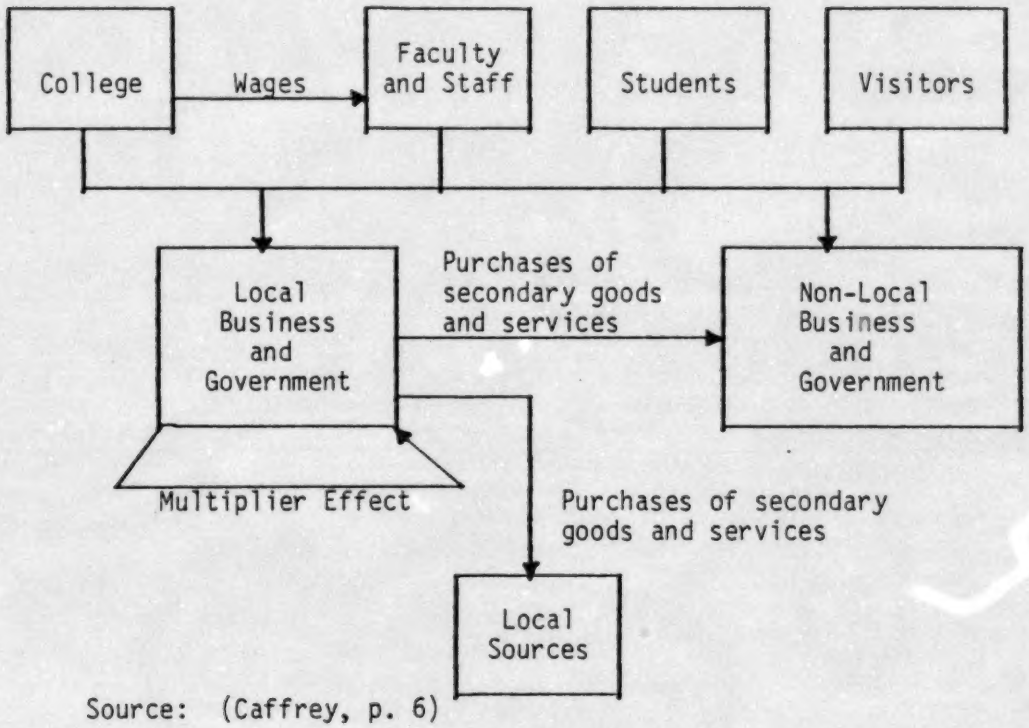


Source: (Caffrey, p. 5)

The next level of model, a two-area expenditure model, is presented in Figure 3. It includes multiplier effects of expenditures on local and non-local businesses and government. This model provides the basis for a 1972 study titled, The Economic Impact of Arizona State University on Maricopa County. Hogan and McPheters in 1979 published an update of the 1972 study. The total 1977-78 economic impact of Arizona State University was $281.9 million of which students accounted for 81.8 percent of the total or about $208.2 million.

Ronald Gunderson performed a study in 1979 for Northern Arizona University titled, The Economic Impact of Northern Arizona University on the Flagstaff Community, based upon the 1978-79 academic year. A March, 1982 update shows an economic impact of $59.5 million of which students accounted for 60.9 percent of the total or about $36.2 million.

FIG. 3. A two-area expenditure model.



Source: (Caffrey, p. 6)

A third model illustrates the economic impacts of universities on local businesses, governments and individuals. This model was generally followed by Gennaro and O'Keefe in their 1974 study titled, Economic Impacts of the University of Arizona on the Tucson Metropolitan Area. The University of Arizona-Related Local Business Volume in this study was estimated at $251.2 million. Of this, $56.9 million were local expenditures by students. An interesting aspect of this model is that it shows negative as well as positive impacts.

The student survey expenditure data from the above three studies have been updated and adjusted (as appropriate to a state-level study) to provide the basis for student direct expenditures used in this study. It should be noted that care must be exercised in comparing these studies because of differing student definitions, expenditure definitions, model assumptions and time periods when the studies were conducted.